



**MÚSZER
AUTOMATIKA
GROUP**

MŰSZER AUTOMATIKA GROUP

Műszer Automatika Ltd. headquarters and project office



- Műszer Automatika Ltd.
- RWT Railway Technology Ltd.
- MKTM Ltd.
- MAUMIK Ltd.
- Cell-Modul Ltd.
- Műszer Automatika Ukraine
- Műszer Automatika Development Co.

Dear Partners,



HORVÁTH JÓZSEF
founder and director

I would like to greet you on behalf of Műszer Automatika Company Group.

I am honoured to welcome you as a partner of my company. I founded the company more than 30 years ago, and it is still a 100% Hungarian-owned Company.

Műszer Automatika Cooperative started its business in 1982. During the following decades the company grew from the small cooperative into a strong international company with hundreds of employees. Successful and complete solutions for automation tasks led to a wider range of products and services. The key areas of our activities are provided by our own well-experienced subsidiary companies from the design, to manufacturing construction and operation. Műszer Automatika Group currently consists of five Hungarian and two foreign members.

**A Műszer Automatika Group
awards for innovation**



From the thought to a solution

The group has more than 30 years of experience in highly accurate assessment of the customers' needs, exploration and analysis of the problems to be solved and common pathfinding which leads to the solution. We have extensive experience in solution development and even more in the maintenance and operation of our systems.

Our company can provide support in the implementation of a customized, optimized system by creating new products or further developing existing products if that is what the jointly elaborated technical solution requires.

Our group's area of expertise is safety-critical, high-availability automation and process control systems and equipment, their energy supply and grouping around transportation.

The group's companies connect to our customers either independently or through the project office of Műszer Automatika Ltd. The more complex projects including design, manufacture, construction, management and operational activities are processed through the project office. We employ highly skilled, experienced engineers, project managers and assistants with the required permissions to perform the assigned tasks and activities.



Project meeting



**CNC setup in manufacturing plant
at Nagykanizsa**

Available permissions according to the classification of the Hungarian Chamber of Engineers:

- Railway construction project manager
- Senior supervisor for railway electrical engineering construction work, installation and maintenance
- Senior supervisor for railway telecommunications construction, installation and maintenance
- Technical supervisor for the construction of particular transportation buildings
- Electrical design engineer (electrical railway, railway signalling, building electricity)
- Expert of electrical installation
- Expert of transportation

Our companies perform the warranty and contract maintenance, repairs and undertake the installation of system components with the necessary number of workers by regions in Hungary.



Vehicles of railway and gas detectors' service in front of the service centre

Some of our trained employees have the "explosion-proof equipment operator" certificate as well. These specialists receive regular management, maintenance and troubleshooting training involving the equipment they service. The gas detector service centre located at the Budaörs company headquarters has an inspection station authorization and liability insurance. There is

always a sufficient amount of certified test gases and chemical inventory to ensure continuous service availability. A modern, well equipped car and van fleet supports the service network.

Development and manufacture of systems and system components

Innovation for your safety

Műszer Automatika Ltd. has remained competitive and gained market advantage through rapid technological advancements for the past 30 years. The most interesting area of development was to meet the specific needs of jobs that require flexible solutions. Previously, these tasks were the main features of development, but the evolution of the group resulted in the use of a wide range platform which now constitutes a solid basis for meeting the special needs of adaptive innovation. This platform merging continues gradually during the current project design and development activities, thus our products improve continuously. Next to the development of high reliability electrical systems and devices, our company plays an important role in the development of hydraulic drive systems and products implementing them.

Our current development focuses on new products in the transportation and energy sectors.

The Műszer Automatika Group is committed to continuous rejuvenation, it helps students wishing to study at a university with gaining work experience and often employs postgraduate engineers. This way, the company's intellectual heritage can be preserved and updated simultaneously, which ensures the integration of renewal and capacity for change.

The development and manufacturing activities meet the requirements of the ISO-9001 certified quality assurance system.



Design works using CAD application

Certificates of quality environmental management and product compliance

The long-term cooperation with customers and co-operating partners, demonstrates our commitment to high-level activities, in addition to formal certificates. An environmentally

friendly operation was approved in accordance with the ISO 14001 environment management system in 2011.



The manufacturing operations include metal working, wood working for furniture manufacturing, electrical wiring, electrical circuit board assembly and equipment assembly. Our machine park consists of plate machining,

CNC systems and welding machines. Furthermore, it is possible to implement fine metal working tasks. The traditional cold forming tools are manufactured

in the company's own workshop. Lead-free soldering stations and metering are available for the power supply industry.

Equipment assembly and measurements are performed in modern workshops. Continuous quality assurance is provided for all the machines, and finished units to ensure consistent quality.



Railway products to increase safety

Market demand made it necessary to develop electronic pulse generators and blinkers for conventional relay-driven level crossing interlocking for the first time. In order to eliminate the shortcomings of conventional relays, a modular product family made up of relay logic supporting printed circuit cards was developed. It was able to support level crossings and blocks, and it had much better diagnostic abilities than the signalling equipment of the preceding relay technology. The use of microprocessor controlled signalling has reached its most complex application in the corporate group by the implementation of the first Hungarian electronic level crossing signalling systems. It has been used on internationally frequented mainlines abroad as well since its introduction on the suburban line in Budapest, carrying heavy traffic in the urban environment.



A UTB-M1 interlocking situated on the railway line of Raaberbahn in Kópháza

Barrier drives and LED light sources

Currently, the most common railway safety equipment is the hydraulic barrier drive family. The almost 2000 installations prove that the hydraulic operation is perfectly suitable for outdoor applications and the barriers with breaking elements successfully counter the inattention of drivers. As a result of our robust innovation in barrier drive technology, it is able to move the nine-meter-long (295') barrier boom fulfilling the demands of the international market, and its electronic control makes it possible to adjust the operation to specific requirements.



A HSH-03 type barrier drive at Cinkota station of BKV-HÉV suburban railways

The use of LED lights to replace light bulbs serves as a reliable and cost-effective solution for the level crossing road signals, as they can be mounted into the regular lamp-sockets of the general relay system without any alternation. The almost 1900 optics have proven that they were able to emit regular signal properly even in case of minor exterior damages, such as broken lenses.

Railway switch equipment

The modern switch drive family is a result of our pioneer work in the innovation of the development of hydraulic switch drives which can be adapted to the requirements of different switch types thanks to its flexible construction. The product family which is easily adjustable to the railways' needs has an independent member: the intermediate end-position checking device. It can control the switch setting process even for high radius turnouts.

The microprocessor controlled railway switch heating is built and installed according to the given environmental conditions and the available energy supply. The switch heating can be connected to a remote control system to alert in case of system malfunctions and fix any operational irregularities.

The VEM-02 type railway switch dynamometer helps diagnose the status of railway switches and switch drives and it also creates computer-based data logs during regular maintenance.



Control and switching cabinets for switch heating at mainline station Kelenföld

Train detection and onboard equipment

The basis of train operation safety is the precise and reliable sensing of railway vehicles and increasing signal visibility by onboard signal transmission. The two systems have intertwined in Hungary by long, coded track circuits and onboard signal transmission, which is supported by the corporate group providing track coders, receivers and onboard signalling units.

Track coders are used to generate and control 75 Hz coded power supplies. The system monitors the compliance of the signs going out to the track, the correctness of coding and it regularly tests its own circuits. Apart from the

75 Hz train detection and signalling, transmitters and receivers are produced for the 13 kHz voice frequency train detection. A further advantage of continuous track circuit and signal transmission is the capability of automatic real-time exploration of certain rail failures without significantly raising operational expenses.



Some onboard parts of EVM type onboard signalling system

Based on the coded track signals, onboard signalling is able to provide continuous signal transmission, vigilance checking and speed signal forwarding towards the onboard ETCS equipment independently, even on railways without RBC or balises. In the case of railways equipped with ETCS, EVM can provide vigilance checking by the onboard system through an interface developed by us.

Average safety level railway applications

Safety criteria different from mainlines are applied to tram termini and road-tram crossing equipment. The modularly designed, microprocessor controlled systems are developed



Tramway terminus signalling installed in heritage environment at Hűvösvölgy

for the tram termini of Budapest Transport Closely Held Corporation. They are able to control the main signals at the termini and the tram-road crossing signals of the affected level crossings autonomously.

The catenary energy remote control (FET) – based on a computer aided process control system – makes the remote supervision and control of the topologically medium and large scale technological processes

possible, supported by IP-based communication. In case of a mains power disruption or failure, the consumers can be supplied with electricity within a couple of minutes using FET. It increases operation reliability from wired power and reduces expenses significantly since the switch-over does not have to be done manually, only occasionally in extreme environments the dispatcher has direct and rapid access to the process. The computer system that controls the railway switch heating is based on a similar system.

Power supply, battery chargers

The power-supply and battery charger branch is interested in developing and producing railway, industrial and general purpose equipment. Because of the distinct requirements, separate product families have been developed for railway and for general purposes use. The battery chargers have appropriate protection on their inputs and outputs so they can be used even without human supervision.

The accumulator testers and regenerators – which help optimize the life of accumulators – also operate autonomously.

Rechargeable batteries:

- Liquid starter and traction batteries of 10-220Ah
- Absorbed electrolyte batteries 10-220Ah
- Gel-filled (gel) batteries 20-220Ah
- Li-ion batteries 20-220 Ah

To support unique needs DC/DC converters have been developed which provide detached and stabilized DC power out of different DC sources even with limited current and complicated environmental and disturbance conditions. The equipment can be produced in accordance with railway standards in signalling unit, or Europa-rack outfit, so they are capable of cooperation with several types of systems and can be connected to remote supervision systems.

Energetics

Apart from catenary remote control and battery chargers for railways, Múszér Automatika Group offers further possibilities for cooperation in energy and gas production. Old challenges of the energy sector are the significantly fluctuating power demand, the low-quality fossil fuels and the incineration of waste. As a result of an innovation of Múszér Automatika Ltd., hydrogen enriched generator gas can be produced from low caloric value brown coal and carbon waste. After carbon scrubbing, it can be used to produce electricity and thermal energy by burning it in a gas engine and/or gas turbine.



Power supply system with batteries integrated in a signalling system

Thorough laboratory experiments have confirmed that carbon scrubbed gas – that can be used in the energy industry – can be produced via the aforementioned method.

The system contains a gas producer, a gas storage, and an energy producer unit besides a dross processor. The gas producer unit is energetically self-sustaining, external energy sources are not required to keep the temperature above

1000 °C. The produced gas is transferred into the storage after scrubbing and desulphurization. The energy producer unit can use the stored, gas to produce electricity via a gas engine or a gas turbine. Low-quality cement can be made from the dross.

This process is advantageous because the low caloric-value brown coal and carbon waste can be used in an environmentally friendly way to produce electricity. Because of its hydrogen content, the carbon-dioxide emission is reduced by almost 40%. Because of the continuous gas production it can operate as an electric power plant and the gas storage serves as an accumulator.

The produced gas can be used in the chemical industry and as a source of hydrogen; it can provide fuel for mobile machines. Since the technology is

energetically self-sustaining, it can also be installed in places far from existing power networks (it can produce up to 250-1000 kVA of electric power), where carbon based material and process water is available.



Electronic units performing high voltage power steering

Gas detectors

Development, production, installation and servicing of gas detectors have been a continuous operation since the establishment of the group. The products of our company – known as a dominant producer of the market – are recognized throughout Central Europe, and are used with satisfaction by well-known oil, gas, petrochemical, utility and wastewater companies and organizations where gas leaks, poisoning and explosion hazards may exist. In addition to our industrial partners, we also serve smaller-scale customers such as apartment buildings (garages, boiler rooms, where danger is highest).

As a market leading Hungarian manufacturer we have sold over 17,000 units of gas concentration measuring devices for various businesses.

These sensors operate based on semiconductor, electrochemical, catalytic or infrared methods, depending on the properties of the gases to be detected.

Our gas detectors work as life and property protection in closed or open spaces where appearance of hazardous or noxious vapours, gases may cause explosion or poisoning, such as follows:

- Natural gas, propane and biogas-fuelled boilers
- Mines, mining, and processing plants
- Power plants and waste incinerators
- Chemical factories, labs
- Medical facilities, operating rooms
- Logistics facilities
- Food industry facilities
- Hypermarkets, supermarkets and leisure centres
- Swimming pools, spas



Integrated gas detector, fire detector and forced ventilation system in an underground parking lot



128 channel gas detector system controlled by microprocessor

Modern and durable interiors



Interior design accomplished according to the customer's design code - may it be modern or antique



Using special, modern machinery allows us to optimise the production to precisely meet our customers' needs



At Múszér Automatika Group we aim to provide high quality and durable products, excellent solution development and services. We are able to carry out turnkey projects for interior design of buildings and installations including electrical wiring, furniture design and manufacture.

We are greatly experienced in the design and manufacture of heavy duty furniture for customer service offices – especially for customer service and public institutions, such as government buildings, schools, banks, office buildings etc. We also have experience in designing and furnishing the interiors of department stores. According to customers' needs service range can be extended to outdoor areas.

Our company is equipped to design, manufacture and install the furniture needed outside – whether it be made out of metal, wood or plastic.

Műszer Automatika Ltd.

Műszer Automatika Ltd. is the leading member of the group. Its business activities include the following:



- General contractor for development, production and trade of transportation automation, process control, power supply, telecommunications and electrical technology products including the installation and maintenance of these products as well
- Development, production and trade of fire protection and building automation systems, gas-detection and gas concentration measuring systems.
- Maintenance and servicing of railway equipment and gas detection devices
- Management of railway infrastructure design and construction projects, tramway and railway process control works, interior and outdoor design
- Development, installation and maintenance of corporate management systems



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RWT Railway Technology Ltd.

RWT Railway Technology Ltd. develops and manufactures transport automation devices, switching power supplies, battery chargers, DC / DC converters and DC / AC inverters. The company's electronic and mechanical component manufacture and assembly are carried out in our factory in Nagykanizsa and the assembly workplaces at Budaörs headquarters.



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MKTM Ltd.

MKTM Ltd. was founded to meet the growing needs for designers in the Műszer Automatika Group. The company can provide a solid background for the former railway engineering activities in Hungary and Iraq, where the Group has significant design experience. In addition to design activities, the company also provides expert transportation consultations during the implementation of its projects. The company's activities include transportation planning and engineering services including feasibility studies, design preparations, projects engineering, and management, technical and marketing execution.



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MAUMIK Ltd.

MAUMIK Control Systems Ltd. was founded with the participation of professionals who have great practice and experience in system design, remote control and remote monitoring systems. Its main task is microelectronics-based regulation, control and remote monitoring. Its procedures also include manufacture and maintenance services of remote control systems and technology components, as well as development and the establishment of dispatchers' offices. The company's top priority is the design, remote control and implementation of power systems for local railways and mainlines or other transport systems supplied by electric traction power.



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Cell-Modul Ltd.

Main activity of the company is interior design, furniture manufacture for office buildings, stores, customer service offices, banks, post offices, catering companies and metal structures for buildings (stairs fittings, railings) as well. The project management activity includes the full spectrum of the services from pre-assessment through computer visualization to operational readiness, design, manufacture and construction of the business equipment, all provided by the same company.



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Múszer Automatika Ukraine

Múszer Automatika Ukraine is based in Beregovo. Its main activity is to market our gas detectors, but the company provides full representation of our products and services as well.



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Múszer Automatika Development Co.

Múszer Automatika Development Co. (MADCO) was founded in Erbil, Iraq to support the dynamic development seen in Iraq and the Kurd areas. The company also wants to continue the design and engineering work started by other companies within the group. Múszer Automatika's office in Baghdad will continue operating to maintain our good relationship with the Iraqi central government.



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Műszer Automatika Group in the World

Following the success in Hungary our group expanded into foreign markets. The projects include foreign products used in Hungary by foreign customers, tasks completed abroad, in cooperation with the customer. In addition, based on the positive experience regarding our company in foreign countries, further requests were received after project completion and implementation on many occasions.



**International connections of
Műszer Automatika Group**

Africa

- South Africa
- Egypt
- Sudan

America

- United States of America
- Brazil

Asia

- Iraq
- Kazakhstan
- Mongolia
- Sri Lanka
- Turkey

Europe

- Austria
- Bosnia and Herzegovina
- France
- Croatia
- Germany
- Romania
- Italy
- Russia
- Spain
- Switzerland
- Slovenia
- Ukraine

References

Given the wide range of activities of the Műszer Automatika Group, only a few significant projects are listed from the design, equipment manufacture, installation and after-sales areas



2010

Customer: Nemzeti Infrastruktúra Fejlesztő Zrt. (National Infrastructure Development Corporation).

Project: The Műszer Automatika Group's tasks included the design and construction of 33 new electronic level crossing interlocking for about 120 kms long railway line for the Sopron-Szombathely-Szentgotthárd track upgrade project and the design of the conversion and construction of 21 existing relay driven interlocking and the detailed design and installation of strong - and low-voltage wiring, and switch heaters.



2008-2011

Customer: Nemzeti Infrastruktúra Fejlesztő Zrt. / Doprastav a.s. (National Infrastructure Development Corporation / Doprastav a.s.)

Project: Design of the switch heating within the Budapest-Székesfehérvár railway development project: Kelenföld station is one of the main hubs of the country. It establishes links with very high-traffic lines from Austria, Slovenia and Croatia; it also plays an important role in the seasonal traffic for Lake Balaton, and in the Budapest suburban lines. The station's reliable operation and the development of these railway lines were continuously in the centre of attention. The Kerepesi út catenary energy control centre was renovated during this work.

2008

Customer: Republic of Iraq Ministry of Transportation, Iraqi Republic Railways Company (IRRC)

Project: Traffic analysis of the Hammam Alil - Saboniya double-track railway, designed for 120 km/h speed. Development of alternatives and cost estimates with the preliminary track and operations design.



2008-2011

Customer: Republic of Iraq Ministry of Transportation Iraqi Republic Railways Company (IRRC)

Project: In the Kirkuk - Sulaimaniya railway project our company designed a new, 120 kms long, double-track railway line, capable of supporting a speed of up to 200 km/h, and the associated side-lines. The design included a geodetic survey, route plans, and designs for the railway, building structures, interlocking, energy supply planning, and architectural plans for the stations.





2009-2013

Customer: Budapest Főváros Polgármesteri hivatala / Közlekedés Kft. (Budapest Capital Mayor's Office / Transport Ltd.)

Project: Csepel Ridge Road project, railway signalling HMI termini: During the project Műszer Automatika Group's task was to elaborate outdoor HMIs for high-traffic side-lines leading to Budapest Freeport. The sidelines go through and branch out just before a very important roundabout, where the traffic is controlled by traffic lights. This equipment is unique in the country, expanding the former boundaries of transportation planning and operates successfully in the junction.

2009-2012

Customer: Nemzeti Infrastruktúra Fejlesztő Zrt. / Pro Urbe Kft. / Termini Rail Kft. (National Infrastructure Development Corporation / Pro Urbe Ltd. / Termini Rail Ltd.)

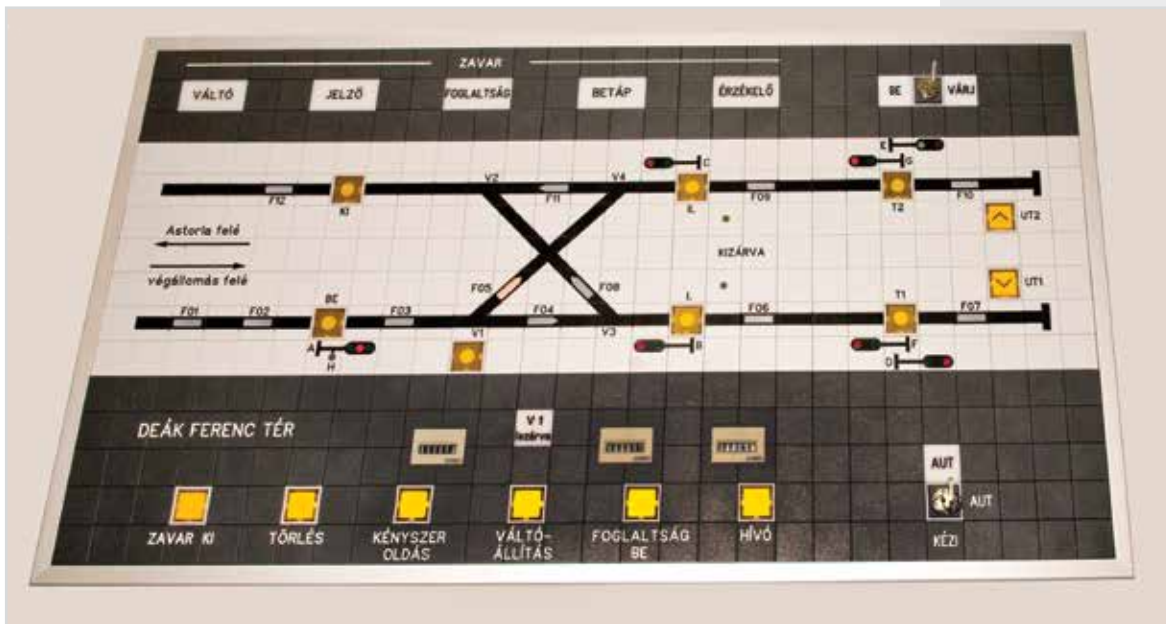


Project: Reconstruction of the AS 137 open line level crossing signalling within the Budakalász traffic safety measures framework: During the project, in addition to the financiers, Műszer Automatika Group was the only company which has been actively involved in every project phase, (planning, regulatory proceedings, negotiations and execution). The delivered equipment was developed, manufactured and marketed by our own company.

2011

Customer: TEN-T Zrt. (TEN-T Co.)

Project: Budapest's Heart Program – design and construction of the signalling at BKV Tram Terminal at Deák tér.



2013

Customer: STRABAG Zrt. (STRABAG Co.)

Project: Construction of the No. 4 metro line in Budapest – surface design projects; design and construction of converters for BKV "Körtér", process control, transmitters, secondary protection, connecting to dispatch centre.



2012-2013

Customer: Colas Zrt. (Colas Co.)

Project: Miskolc tram development – remote control of electrical transformers, design and installation of the remote controlling of five transformers. Providing parameters for their protection, design and installation of a central dispatching software system for MVK Co.

2003

Customer: Matáv Rt. (Matáv Co.)

Project: Protection of telephone cables and their area from natural gas explosions in Matáv Co.'s 17 telephone centre in Budapest. Solving signalling, controlling and remote transmission tasks.

2006

Customer: Jet-Vill Kft. (Jet-Vill Ltd.)

Project: Implementation of equipment for ethyl alcohol vapour sensing, signalling and intervention control in Zwack Unicum Co. ripening cellar. During the project it was a priority to protect the historic character of the facility. We installed the equipment with loop-through cabling structure to solve the task that required 30 detection points.

2008

Customer: Pick Szeged Zrt. (Pick Szeged Co.)

Project: Detecting ammonia (used as a refrigerant) in the meat processing plants of Pick Szeged Co., prevent poisoning in the event of a plant malfunction.

2008

Customer: Trane Hungária Kft. (Trane Hungary Ltd.)

Project: Sensing carbon monoxide, sulphur dioxide, nitrogen dioxide, hydrogen gas and lack of oxygen at the production lines of Ilden Hungary Co. It was an important requirement to connect with the process control systems installed by Taikisha.

2009

Customer: Paksi Atomerőmű Zrt. (Paks Nuclear Power Plant Co.)

Project: Prevention of potential explosions caused by ethyl alcohol vapour during cleaning in the nuclear fuel storage room of the nuclear power plant. During the project it was high priority to develop a connection with the nuclear power plant safety and intervention systems.

2010

Customer: Dunamenti Erőmű Zrt. (Dunamenti Power Plant Co.)

Project: Design and installation of hydrogen, carbon dioxide and hydrochloric acid sensor systems in the different areas of the Dunamenti Power Plant. Design of connections to indoor and outdoor warning and intervention systems.

2011

Customer: Audi Hungária Motor Kft. (Audi Hungary Motor Ltd.)

Project: Design and installation of carbon dioxide, oxygen, methane and ammonia sensor systems in the Győr car manufacturing plant of Audi Hungary Motor Ltd. Design of connection to existing warning and intervention systems.

2010

Customer: Ingatlan Ingatlanhasznosító Kft. (Ingatlan Real Estate Ltd.)

Project: Complete renovation of the Sopronbánfalva monastery; the refectory wall panelling, interior furniture (tables, chairs, sideboards and doors).



2011.

Customer: SZ-L BAU Kft. Tapolca (SZ-L BAU Ltd. Tapolca)

Project: Balatonalmádi health centre construction. Renovation of the old building, construction of a new wing and furnishing of the office premises.

2010

Customer: Swietelsky Vasúttechnika Kft. (Swietelsky Rail Technologies Ltd.)

Project: Building of the Celldömök City Hall – furnishing the newly built city hall. Meeting room, wall coverings, document office, etc.

2012

Customer: Alföld Kereskedelmi Zrt. Kecskemét (Alföld Trade Co. Kecskemét)

Project: Installing new store racks for the departments of Alföld Department Store. Manufacturing store racks.

2010

Customer: MAKITA Elektromos Kisgép Értékesítő Kft. (MAKITA Power Tools Sales Ltd.)

Project: Design and manufacture of Makita branded uniform stands for several locations



2010

Customer: Port Oil Oktán Kft. (Port Oil Octane Ltd.)

Project: Internal furnishing of the gas station shop. Design, manufacture, transport and installation of service counters and shop shelves

2012

Customer: Dreiszker és Társai Kft. (Dreiszker and Co. Ltd.)

Project: The expansion of Bük Caramel Hotel with a conference room. Design, manufacture, supply and installation of massage rooms, bathroom counters, bars, radiator covers, and decorative building components.

